CLAIMS

What is claimed is:

1. An ink-jet printing apparatus, comprising:

at least one printhead portion including an underprinting fixer fluid comprising at least one cationic component and at least one printhead portion including an ink composition comprising at least one anionic component;

wherein, when the ink composition is printed on a medium over the fixer fluid printed on the medium, the ink composition and fixer fluid together form an amorphous viscous fluid, the viscous fluid having a viscosity greater than the ink composition.

2. The apparatus of Claim 1, wherein the anionic component comprises at least one anionic binder.

3. The apparatus of Claim 2, wherein the at least one anionic binder comprises polymers having at least one complexing group.

4. The apparatus of Claim 3, wherein the at least one complexing group is selected from the group consisting of Ethylene Diamine Tetraacetic Acid, Acetyl Acetonate Maleic Anhydride, an Acrylate and combinations thereof..

5. The apparatus of Claim 3, wherein the polymers comprise styrene.

6. The apparatus of Claim 4, wherein the anionic binder comprises hydrolyzed styrene maleic anhydride.

7. The apparatus of Claim 1, wherein the anionic component comprises dye having anionic functional groups.

8. The apparatus of Claim 7, wherein the dyes having anionic functional groups are selected from the group consisting of sulfonated dyes with non-polar groups, dyes with protonatable groups, dyes with carboxylate groups and dyes with phosphonate groups.

9. The apparatus of Claim 1, wherein the ink composition further comprises low-molecular weight hydrophilic compounds.

10. The apparatus of Claim 9, wherein the low-molecular weight hydrophilic compounds are selected from the group consisting of inorganic salts and lower alcohols

11. The apparatus of Claim 1, wherein the at least one cationic component comprises cationic polymers.

12. The apparatus of Claim 11, wherein the cationic polymers are polyelectrolytes selected from the group consisting of $R_1R_2R_3R_4N^+$; $R_1R_2R_3R_4P^+$ and $R_1R_2R_3R_4As^+$, where R can be H, alkyl or other organic substituent.

13. The apparatus of claim 12, wherein the polyelectrolytes comprise branched or linear polymer chains.

14. The apparatus of Claim 11, wherein the cationic polymers are in solution with non-polymeric cations selected from the group consisting of calcium ions, aluminum ions, barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

15. The apparatus of Claim 12, wherein the cationic polymers are tetrasubstituted ammonium salts.

16. The apparatus of Claim 1, wherein the at least one cationic component comprises non-polymeric cations selected from the group consisting of calcium ions, aluminum ions, barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

17. A dye-based ink-jet ink composition comprising :

at least one anionic component,

wherein, when the ink composition is printed on a medium over an underprinted fixer fluid comprising at least one cationic component, the printed ink composition and the underprinted fixer fluid together form an amorphous, viscous fluid on the medium, the mixture being an amorphous viscous fluid, having a viscosity greater than the ink.

wherein, when the ink composition is printed on a medium over the underprinted fixer fluid, the ink composition and fixer fluid together form an amorphous viscous fluid, the viscous fluid having a viscosity greater than the ink composition.

18. The ink-jet ink composition of Claim 17, wherein the anionic component comprises at least one anionic binder.

19. The ink-jet ink composition of Claim 18, wherein the at least one anionic binder comprises polymers having at least one complexing group.

20. The ink-jet ink composition of Claim 19, wherein the at least one complexing group is selected from the group consisting of Ethylene Diamine Tetraacetic Acid, Acetyl Acetonate Maleic Anhydride, Acrylate and combinations thereof.

21. The ink-jet ink composition of Claim 19, wherein the polymers comprise styrene.

22. The ink-jet ink composition of Claim 20, wherein the anionic binder comprises hydrolyzed styrene maleic anhydride.

23. The ink-jet ink composition of Claim 17, wherein the at least one dye comprises anionic functional groups.

24. The ink-jet ink composition of Claim 23, wherein the at least one dye having anionic functional groups are selected from the group consisting of sulfonated dyes with non-polar groups, dyes with protonatable groups, dyes with carboxylate groups and dyes with phosphonate groups.

25. The ink-jet ink composition of Claim 17, wherein the ink composition further comprises low-molecular weight hydrophilic compounds.

26. The ink-jet ink composition of Claim 25, wherein the low-molecular weight hydrophilic compounds are selected from the group consisting of inorganic salts and lower alcohols.

27. An underprinting fixer fluid comprising:

at least one cationic component,

wherein, when an ink-jet ink composition comprising at least one anionic component is printed on a portion of a medium underprinted with the fixer fluid, the ink composition and the fixer fluid together form an amorphous viscous fluid, the viscous fluid having a viscosity greater than the ink.

28. The underprinting fixer fluid of Claim 27, wherein the at least one cationic component comprises cationic polymers.

29. The underprinting fixer fluid of Claim 28, wherein the cationic polymers are polyelectrolytes selected from the group consisting of $R_1R_2R_3R_4N^+$; $R_1R_2R_3R_4P^+$ and $R_1R_2R_3R_4As^+$, where R can be H, alkyl or other organic substituent.

30. The underprinting fixer fluid of claim 29, wherein the polyelectrolytes comprise branched polymer chains.

31. The underprinting fixer fluid of claim 28, wherein the cationic polymers are in solution with non-polymeric cations selected from the group consisting of calcium ions, aluminum ions barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

32. The underprinting fixer fluid of Claim 29, wherein the cationic polymers are tetrasubstituted ammonium salts.

33. The underprinting fixer fluid of claim 27, wherein the at least one cationic component comprises non-polymeric cations selected from the group consisting of calcium ions, aluminum ions, barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

34. A method of ink-jet printing, the method comprising the steps of:

a) ejecting at a location on a medium an underprinting fixer fluid comprising at least one cationic component ;

b) ejecting at the location on the medium an ink composition comprising at least one anionic component ;

wherein the ink composition and the fixer fluid together form an amorphous viscous fluid, the viscous fluid having a viscosity greater than the ink composition.

35. The method of Claim 34, wherein the anionic component comprises at least one anionic binder.

36. The method of Claim 35, wherein the at least one anionic binder comprises polymers having at least one complexing group.

37. The method of Claim 36, wherein the at least one complexing group is selected from the group consisting of Ethylene Diamine Tetraacetic Acid, Acetyl Acetonate, Maleic Anhydride, Acrylate and combinations thereof.

38. The method of Claim 36, wherein the [branched] polymers comprise styrene.

39. The method of claim 37, wherein the anionic binder comprises hydrolyzed styrene maleic anhydride.

40. The method of Claim 34, wherein the at least one anionic component comprises dye having anionic functional groups.

41. The method of Claim 40, wherein the dyes having anionic functional groups are selected from the group consisting of sulfonated dyes with non-polar groups, dyes with protonatable groups, dyes with carboxylate groups and dyes with phosphonate groups.

42. The method of Claim 34, wherein the ink composition further comprises low-molecular weight hydrophilic compounds.

43. The method of Claim 42, wherein the low-molecular weight hydrophilic compounds are selected from the group consisting of inorganic salts and lower alcohols.

44. The method of Claim 34, wherein the at least one cationic component comprises cationic polymers.

45. The method of Claim 44, wherein the cationic polymers are polyelectrolytes selected from the group consisting of $R_1R_2R_3R_4N^+$; $R_1R_2R_3R_4P^+$ and $R_1R_2R_3R_4As^+$, where R can be H, alkyl or other organic substituent.

46. The method of Claim 45, wherein the polyelectrolytes comprise branched polymer chains.

47. The method of Claim 44, wherein the cationic polymers are in solution with non-polymeric cations selected from the group consisting of calcium ions, aluminum ions, barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

48. The method of Claim 45, wherein the cationic polymers are tetrasubstituted ammonium salts.

49. The method of Claim 34, wherein the at least one cationic component comprises non-polymeric cations selected from the group consisting of calcium ions, aluminum ions, barium ions, strontium ions, zinc ions, magnesium ions and titanium ions.

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